



Virginia Pollution Prevention Case Study Heavy Construction Industry SKW Constructors

Project Information

SKW Constructors, a joint venture of three large construction firms, Skanska, Kiewit, and Weeks Marine, is the design-build contractor for the second Midtown Tunnel across the Elizabeth River. The Midtown Tunnel is located between the cities of Norfolk and Portsmouth, Virginia. The Elizabeth River Tunnels Project is comprised of adding a new two lane tunnel under the Elizabeth River adjacent to the existing Midtown Tunnel; modifications to the interchange leading to the tunnel in Norfolk; maintenance and life-safety improvements to the existing Downtown Tunnel (both eastbound and westbound tubes); and extension of the MLK Expressway in the city of Portsmouth. The project broke ground in Fall 2012 and is scheduled to be completed in Spring 2018. Once the project is completed, it will provide relief to the heavily trafficked area of Route 58 and Downtown Portsmouth.

Environmental Challenges and Opportunities

Skanska was the first heavy/marine/industrial contractor in the United States to be awarded an ISO 14001 certification for their comprehensive Environmental Management System (EMS). Skanska – through the SKW joint venture - incorporates all of the ISO 14001 elements into their work on the Elizabeth River Tunnels (ERT) Project. In the Spring of 2014, SKW Constructors' ERT Project was accepted into the Virginia Environmental Excellence Program (VEEP) at the Extraordinary Environmental Enterprise (E4) level. SKW's ERT Project is the first construction project in the state to ever be accepted into this program.

SKW's decision to go above and beyond in their environmental compliance program was an internal decision, with no outside influence. At the beginning of the project SKW chose to make environmental stewardship one of their top responsibilities. Management was in full support of this decision and encouraged staff and crew to consistently find new ways to improve the environment while producing a quality product.

When looking into opportunities to excel in environmental management on the ERT Project, SKW looked for environmental initiatives and programs that would allow them to have ongoing success as well as getting them involved with the local community. The VEEP program gave the project a set goal and standard to achieve and had an accountability component that pushed SKW to keep looking for more ways to improve the environment while staying in compliance and adhering to tight production schedules and budgets. Work with the ERT Project has allowed SKW to get more involved in the local community and created opportunities for SKW employees and their families to be involved in protecting the environment.

Implementation of the Program

One of the first priorities of the ERT Project was to develop an Environmental Management Program and Plan. The plan outlines the environmental requirements for the project as well as best management practices to be followed. Throughout the process, promoting and encouraging sustainable behavior has been a priority for the project management. The program consists of

many sustainability goals including recycling, reusing, reducing waste, implementing best management practices, and encouraging staff and community involvement. The sustainability program helps ensure environmental compliance as well as finding ways to go above and beyond compliance to enhance the environment.

SKW personnel are taking the lead in environmental compliance on the job sites on both ends of the tunnel project in Norfolk and in Portsmouth. SKW works hard to improve the environment as well as save the project money. One way that SKW has made environmental considerations as part of their day-to-day decision making is with their Environmental Checklist, which is completed when developing work plans for the project. Every task, large and small, requires a work plan and must be approved by all department heads. The checklist addresses environmental concerns and requirements for each specific work plan in coordination with SKW's Safety, Health, and Environmental Management System.

The project has had a 99 percent recycling and reuse rate since it started. Only 1 percent of the waste produced by the project has ended up in the landfill. This waste reduction has been accomplished by identifying the items that would go into the waste stream and determining what can be reused onsite and what offsite needs for the materials were available. In addition to the reuse of construction related materials, SKW encourages recycling in other areas, and works with a company that sorts and recycles their waste. SKW also implements pollution prevention practices by choosing products that are less hazardous and do not require special handling. Purchasing is also limited to just what is needed so that SKW is not over-buying and increasing the waste stream in that way.

SKW has reduced water usage by more than 200,000 gallons due to their self-contained concrete wash out systems from Envirowash. These are closed-loop systems that reduce the amount of water used to wash concrete truck chutes by filtering and reusing the wash water. They also contain all the concrete waste and water, preventing it from being discharged onto the ground. The hardened concrete is removed and placed in a recycling dumpster while the water, approximately 20 gallons, is stored for the next pour. This method is used in place of lined dumpsters and pits and has saved approximately \$72,000 per 100 concrete pours.

SKW uses an aerosol can puncturing system that allows aerosol cans to be emptied and sent to a recycling facility instead of having to dispose of them as hazardous waste. This leaves SKW with a single drum of waste to be disposed of. The cost savings realized by using this system are approximately \$33,000 per 4,400 cans punctured.

Dredging operations were conducted using an environmental bucket whenever possible. An environmental bucket holds the material enclosed in the bucket reducing the amount of sediment released back in to the water. During the dredging, over 20,000 tons of TPH contaminated soil was removed from the Elizabeth River and SKW backfilled with clean material. The project performed on-site treatment of lead contaminated soil using a process called "Fesi Bond". The environmentally safe solution binds the lead to the soil so it cannot be dissolved or dislodged from the soil particle, making the soil a treated waste instead of a hazardous waste. This process saved the project over \$100,000 in disposal costs.

As part of a mitigation project SKW was required to construct 10 square feet of non-tidal wetlands on-site but they chose to go beyond that requirement and restore 100 square feet of wetlands. The requirement to plant the wetlands was part of a permit to install a car float system required for operations. SKW also installed a butterfly garden as part of the 2014 Earth Day celebration. More than a dozen butterfly-friendly plants were installed as well as two rain barrels, two bird baths, several benches, and numerous bird houses. This garden has been certified by the National Wildlife Federation as a wildlife habitat.

SKW ensures environmental compliance in numerous ways, such as utilizing a self contained tire wash system to reduce the risk of environmental violations by reducing fugitive dust and sediment loads in stormwater runoff to the river. Hoses and other equipment are inspected on a daily basis to ensure everything is working properly. All stormwater inlets have at least three types of controls including gator grates, sediment filters, and hay bales with sand bags. For Earth Day SKW crews had to find and take a picture of themselves with their nearest spill kit to raise awareness about this environmental safeguard. The crews also participated in a project-wide Earth Day, cleanup, picking up trash along the shoreline that the tides were bringing ashore.

Community Involvement

SKW is working with the Elizabeth River Project, a local non-profit environmental group, on ways to help protect and improve the environment including fostering oyster spat in cages aligned on the SKW car float. The cages will give the spat an opportunity to grow and then they will be transplanted to oyster beds in the area. SKW is also working with the group to construct oyster boxes from waste concrete produced during the project's concrete pours. The boxes are used to help construct new oyster habitats in the area and over 400 of them have been created. These boxes are helping to improve the environment for oysters in the river and making use of a byproduct that would otherwise be sent off-site for costly recycling.

SKW has also sponsored the local Chesapeake Bay Foundation's "Clean the Bay Day" on the Elizabeth River. Each year SKW has had over 60 volunteers from the project attend the cleanup, where over 3 tons of trash was collected from the Elizabeth River in 2014. SKW partners with the Virginia Port Authority and CSX Railroad, making this one of the largest Clean the Bay Day cleanup events in the area, with a combined participation of over 200 volunteers each year.

Evaluation of the Process

Environmental compliance on the project has become everyone's responsibility. All staff and crews are trained on environmental controls and regulations, each employee undergoes three hours of training before they are allowed to work in the field and a third of that is environmental focused. Involving all facets of the work force, from management to the construction crews, has been critical to the success of the program. By involving everyone in the sustainability program, SKW has achieved "buy-in" at all levels and has encouraged everyone to be on the lookout for new ways to improve.

Employees work with the environmental staff to help identify issues as well as develop solutions. All employees have a responsibility to do the right thing and they take pride in the accomplishments of the project. This inclusion of all employees in the process has been a large

reason for the success of the environmental programs. SKW rewards their staff and crew with luncheons, prizes, and positive encouragement.

From the beginning of the project it was obvious that SKW employees all had a personal interest in the environment, whether it was fishing, hiking, swimming, etc. Everyone enjoys the outdoors in their own way and understands that if they don't help to preserve it some of their favorite activities may not be available for their children or grandchildren. Employees enjoy being a part of something bigger and something that they know is making a difference. They show pride in their efforts and look for additional opportunities to have a positive impact.

Even though there was management support, the one thing that could have made SKW's environmental excellence goals easier is time. With the ERT Project being such a large project with demanding time and budget requirements, it was sometimes hard to find additional time for extras. Project personnel did their best to fit in environmental enhancement opportunities when possible, but even more could have been done if there was additional time. Starting the development and implementation of the environmental management system as early as possible in the project helped to make it a success and allowed SKW to further their efforts. When writing the project's environmental manual it was important to incorporate opportunities to exceed compliance as well as to reach out to the community. Researching environmental awards and recognitions in the project area ahead of time will also help to set goals and to educate employees from the start of the project.

Continual Improvement of the Program

SKW hopes to be a mentor and to educate other construction companies on how to produce quality projects while safeguarding, and even improving, the environment as well as saving money. They have produced informational sheets on all of the environmental activities conducted during the project that have helped improve the environment, ensure compliance, and save the project money. These Environmental Excellence Reports are shared throughout SKW as well as to the parent companies and regulatory agencies.

SKW Constructors has been gaining recognition for their excellent environmental practices. They recently received a Silver Governor's Environmental Excellence Award in the environmental projects category. This award recognizes significant accomplishments in minimizing pollution and keeping the community informed of environmental progress. The Elizabeth River Project awarded SKW with their Model Business Award for 2015. SKW is at the "Model Level" because of their extensive pollution prevention and oyster restoration efforts.

SKW is planning on installing pet waste stations on the Elizabeth River Trail, which runs along the shoreline of the Elizabeth River adjacent to the ERT Project site in Norfolk. SKW also installed a new paved bike and walking trail in Norfolk off of Redgate Avenue. As the project advances to completion, there are plans to incorporate finishing touches like landscaping and wetland plantings. As part of the MLK Extension component of the ERT Project, the stormwater basins will be planted with wetland vegetation which will provide additional filtration as well as wildlife habitat. SKW will also be pursuing opportunities to recycle and reuse as much of the remaining materials as possible. SKW intends to leave the project site in better shape than when the project started.